corresponding to a vision deficiency in their left eye and may have a different prescriptive value corresponding to a different vision deficiency in their right eye. By providing two different graphical outputs, each corresponding to a different vision deficiency, at different angles, the vision deficiencies of both of a user's eyes may be counteracted. Examples of such displays, which may be referred to as glasses-free three-dimensional or light field displays, include volumetric displays, multifocal displays, and super-multi-view displays and can create the illusion of a three-dimensional object and/or can correct for the vision deficiencies of different eyes.

[0045] In some embodiments, a vision-corrected graphical output may result in larger text and/or images; a high contrast between graphical elements; a color-shifted display to make certain graphical objects clearly visible; a simplified graphical output not including complex graphical images; and the like. In some embodiments, a vision-corrected graphical output may user alternative colors to correct for colorblindness. For example, a user with red-green colorblindness may be ordinarily unable to perceive the colors red and green. In a color-shifted example, elements that would ordinarily appear as red or green may appear as a different colors easily perceivable to the colorblind user.

[0046] In some embodiments, the aforementioned visual settings may be produced in response to environmental information detected by sensors on an electronic device. For example, a high-sunlight environment may produce an undesired glare on a display of the electronic device. Optical sensors may detect the high brightness level and may perform various display adjusting operations to allow a user to more easily perceive the display, as described herein.

[0047] As noted above, a particular vision-corrected graphical output may correspond to a vision condition of a user. With the use of corrective eyewear (e.g., eyeglasses), a user's visual perception may change depending prescriptive value of the corrective eyewear. For example, a user with a hyperopic vision condition may have prescription glasses to compensate for the user's natural vision condition. In light of the user's changing visual perception, a user's perception of a display of an electronic device may also individually vary depending on whether the user is wearing corrective eyewear or not and depending on the user's vision condition. In some users, wearing corrective eyewear may assist in viewing a display. In other users, wearing corrective eyewear may hinder viewing a display.

[0048] In some embodiments, a camera or other types of optical sensor may be provided on an electronic device to scan at least a portion of a user's face corresponding to the user's facial biometrics. As used herein, the term "optical sensor" includes any type of sensor configured to sense or detect light, such as a camera (e.g., a forward-facing camera, a video camera, an infrared camera, a visible light camera, a rear-facing camera, a wide-lens camera, any combination thereof, and the like); an ambient light sensor; a photodiode; a light detector; a light detection and ranging (LIDAR) detector; and/or any type of sensor that converts light into an electrical signal. An optical sensor may additionally be provided with a light emitter configured to project beams of light and may capture image data of the projected beams of light. As discussed herein, an optical sensor may include any emitter, detector, and/or any signal processing circuitry used to perform an optical detection and/or analysis.

[0049] An optical sensor system, which may include a camera and a light projector, may be used to identify and/or authenticate a previously registered user identity for access into an electronic device. For example, the optical sensor system may initiate a scan of a user's face and may store a biometric identity map of the user's face in an internal storage of the electronic device (e.g., as a facial registration process). Thereafter, whenever the electronic device, via the optical sensor system, determines that a scanned face shares a threshold similarity with the biometric identity map, the electronic device may allow a user to access the electronic device (e.g., the electronic device transitions from a "locked" state to an "unlocked" state). The optical sensor may be used to identify or authenticate a user in order to perform restricted functions including, for example, online purchases, software downloads, application logins, restricted file access, and/or other device operations.

[0050] In some embodiments, additional or alternate sensors may be used to perform an identity recognition process and/or an initiation of a scan of a user's face. For example, sensors using sound propagation to location and map an object, including, for example, detectors utilizing sonar, RADAR, ultrasonic detection, time-of-flight, and/or any combination thereof, may be used in addition or instead of the optical sensors as described herein. The type of sensor is not limited and any sensor capable of detecting facial features, either in three- or two-dimensions may be used.

[0051] In some embodiments, the electronic device may further direct an optical sensor system to scan at least a portion of a user's face after the user's identity is confirmed and may store facial data corresponding to alternate appearances of the user. The alternate appearance may be stored as an alternative biometric identity map as a set or subset of identity maps that are associated with the appearance of the user (e.g., a corrective eyewear scenario in which the user is wearing or not wearing corrective eyewear). In addition to identifying and/or authenticating the user, the optical sensor system may determine a corrective eyewear scenario of the user using one or more of the alternative biometric identity maps created based on a user's previous alternative appearance. For example, when a user is wearing corrective eyewear, the electronic device may confirm the user's identity (using a normal identification procedure) and may store a depth map of the user with the corrective eyewear as an alternate biometric identity map or as a subset of a stored biometric identity maps that are associated with a registered user. Many different alternate appearances may be associated with one user. For example, one alternate appearance may be associated with a user wearing prescription glasses with a rectangular frame, another alternate appearance may be associated with user wearing reading glasses with a circular frame, another alternate appearance may be associated with a user wearing sunglasses, another alternate appearance may be associated with a user wearing no glasses, another alternate appearance may be associated with user with white-framed glasses, and so on.

[0052] Each alternate appearance of the user may be associated captured by an optical sensor system, may be used to generate a subset of identity maps, and may be associated with a particular corrective eyewear scenario. A particular display profile may further be associated with the corrective eyewear scenario. As used herein, a "display profile" may refer to a profile that is used to generate a standard graphical output or a vision-corrected graphical